

# U.S. NONPROVISIONAL PATENT APPLICATION

## Magnetic Bouncing Ball and Target Game

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## **MAGNETIC BOUNCING BALL AND TARGET GAME**

### **Field of the Invention**

[0001] The present invention relates, in general, to devices for amusement, and more particularly to a bouncing ball that has magnetic properties and uses thereof in games and toys.

### **Background of the Invention**

[0002] There is an ever-present need for new toys and games that will capture the imagination of a child, especially such toys that are inherently safe. For instance, while there has long been interest in magnetic toys, such as disclosed in U.S. Pat. No. 4,986,539, wherein a bouncing ball included an embedded cylindrical magnet that enhanced playing ball and jacks. In particular, the weak magnetic attraction provided by the embedded cylindrical magnet simplified putting the game away by magnetically attracting the metal jacks when placed in close proximity.

[0003] While this magnetic feature assists a child in cleaning up, it is believed that such a ball and jack game is still relatively old-fashioned and not appealing. Consequently, a significant need exists for a new toy that would be more interesting.

### **Brief Summary of the Invention**

[0004] The invention overcomes the above-noted and other deficiencies of the prior art by providing a bouncing ball with an embedded spherical rare earth magnet, or "magnetic ball", so that the ball has both a high degree of elasticity for bouncing as well as a strong magnetic field. In particular, the magnetic field is strong enough to magnetically attach one magnetic ball to another magnetic ball or to a ferrous or magnetic surface.

[0005] In one aspect of the invention, a toy is formed from two hemispheric outer shell halves, each including a centered hemispheric recess, formed of an elastic material, that receive a rare earth spherical magnet. The two halves are then bonded together to form a spherical ball.

[0006] In another aspect of the invention, a game is provided comprising one or more of the toys and a target layer that is affixed to a wall or household appliance. Each toy is bounced toward the target layer in an attempt to magnetically attach to a desired goal depicted on the target layer.

[0007] These and other objects and advantages of the present invention shall be made apparent from the accompanying drawings and the description thereof.

#### Brief Description of the Figures

[0008] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention, and, together with the general description of the invention given above, and the detailed description of the embodiments given below, serve to explain the principles of the present invention.

[0009] FIGURE 1 is a perspective exploded view of a toy comprising two elastic hemispheric half shells and a spherical rare earth magnet.

[0010] FIGURE 2 is a side elevation view of the toy of FIG. 1 in an assembled condition.

[0011] FIGURE 3 is a diagram of a target game incorporating the toy of FIG. 2.

#### Detailed Description of the Invention

[0012] In FIGS. 1-2, a toy, or “magnaball”, 10 is advantageously formed from an embedded spherical rare earth magnet 12 placed within an elastopolymer shell. For instance, two hemispheric shell halves 14, 16 may each include a respective centered hemispheric recess 16, 18 sized to receive the magnet 12, with a bonding surface 20 between the shell halves 20 thereafter bonded together.

[0013] It should be appreciated that the elastopolymer may be highly bouncy, like the well-known “SUPERBALL”, or be more resilient and yielding such as a polymer foam.

[0014] Neodymium Iron Boron (NdFeB) magnets have the highest energy density of commercially available magnets. In a tested prototype, when embedded in a commercial SUPPERBALL, a pair of balls could be dropped from about a meter and

have a high probability of sticking together as they bounced. Samarium Cobalt (SmCo) magnets, although weaker, may be used. In some application, Aluminum Nickel Cobalt (AlNiCO) magnets may be used when a weak magnetic field is sufficient.

[0015] Imbedding of magnets into elastopolymers (herein referred to by the generic term of "rubber") results in the novel combination of the "mysterious" attractive-repulsive action of magnets to the elastic action of rubber. This unique combination of properties results in innumerable novel play aspects to the many entertainment aspects of rubber balls. The use of magnets with intrinsically strong magnetic moments (generically classified as "rare earth" magnets) results in the unique ability to embed a magnet into a rubber ball of adequate wall thickness as to maintain the characteristic play qualities of a ball, while adding a strong attraction and repulsion action to the ball, hence the Magnaball toy 10.

[0016] It should be appreciated that magnets of various physical shape results in ball wall thicknesses that may vary. This variation in wall thickness enhances the play characteristic of the ball by introducing an unpredictable bounce to the ball while retaining the novel combination engendered in the Magnaball toy 10. In particular, use of magnets with domains or regions of various strengths allows for the normal uniform play of the ball toy 10 but adds a novel play action that resulting from the unpredictability of the attraction-repulsion behavior of the Magnaball toy 10.

[0017] In some application, allowing for free rotation of a spherical magnet inside the ball allows for a predictable attractive behavior of the ball. This feature brings various novel gaming aspects to the Magnaball toy 10.

[0018] Variations in the composition of the "rubber" used in the formation of the ball allow for various combinations of bounce versus "stick" options in the playability of the Magnaball toy 10.

[0019] In FIG. 3, an exemplary game 30 illustrates a use of the Magnaball toy 10, depicted as a target layer 32 that may be ferrous or magnetic itself or placed upon such a surface (e.g., a steel kitchen appliance like a refrigerator). The target layer 32 may include goals 34 imprinted or formed therein. For instance, these goals may have

a magnetic polarity themselves that give some variability as to whether a first player's set of magnaballs 36 are attracted or repulsed. A second player's set of magnaballs 38 may have a different colored elastopolymer to distinguish the set.

[0020] For instance, the target layer 32 may comprise a magnetic decal that is affixable to a wall surface and may advantageously include ferrous or permanent magnetic portions to vary its attraction or repulsive characteristics when in the proximity of the magnaball toys 36, 38.

[0021] While the present invention has been illustrated by description of several embodiments and while the illustrative embodiments have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications may readily appear to those skilled in the art.

[0022] What is claimed is: